Risk-Benefit Assessment of Foods

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DTU Food
National Food Institute
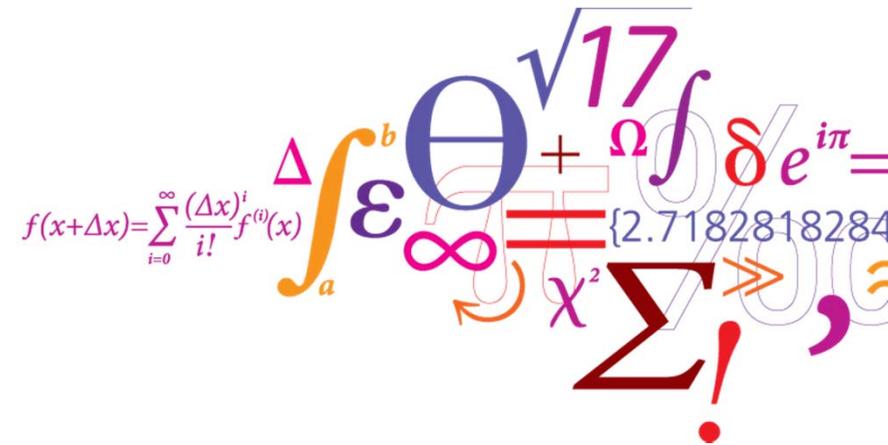
Why is Bread Bad For You? The Shocking Truth

By Kris Gunnars | 381,111 views

"The Whiter The Bread, The Sooner You're Dead."

It has been known for a long time that white bread and refined grains in general aren't particularly nutritious.

Nutritionists and dietitians all around the world have encouraged us to eat whole grains instead.

But grains, especially gluten grains like wheat, have been under intense scrutiny in recent years

Many respected [...] now claim [...] that bread and o[...] unnecessary at [...]

Bread is High i[...]

Fruit and Vegetable[...] Chronic Disease

Hsin-Chia Hung, Kaumudi J. Joshipura, Rui Jiang, Frank B. Hu, David Hunter, Stephanie A. Smith-Warner, Graham A. Colditz, Bernard Rosner, Donna Spiegelman and Walter C. Willett

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Abstract

Background: Studies of fruit and vegetable consumption in relation to overall health are limited. We evaluated the relationship between fruit and vegetable intake and the incidence of cardiovascular disease and cancer

Dangers Of Milk And Dairy Products - The Facts

By Dave Rietz
Webmaster www.notmilk.com
7-6-2

Yes... milk is Mother Nature's "perfect food" ...for a calf... until it is weaned.

Everything you know about cow's milk and dairy is probably part of a Dairy industry MYTH.

Cow's milk is an unhealthy fluid from diseased animals that contains a wide range of dangerous and disease-causing substances that have a cumulative negative eff[...] on all who consume it.

MILK'S [...]

[...] pus, feces cow ate... includi[...]

cancer and [...]

Harvard Medical School.

The study of more than 120,000 people suggested red meat increased the risk of death from cancer and heart problems.

Substituting red meat with fish, chicken or nuts lowered the risks, the authors said.

Experts advise to choose leaner cuts of red meat

The British Heart Foundation said red meat could still be eaten as part of a balanced diet.

The researchers analysed data from 37,698 men between 1986 and 2008 and 83,644 women between 1980 and 2008.

They said that during the study period, adding an extra portion of unprocessed red meat to someone's daily diet would increase the risk of death by 13%, of fatal cardiovascular disease by 18% and of cancer death by 10%. The figures for processed meat were higher, 20% for [...]

Related Stories

Red meat study: Risks 'very clear'

Cut red meat to lower cancer risk

How much red meat [...]

IS ALL FOOD IS DANGEROUS?

2

10 Benefits of Milk

1. Amazing Complexion
2. Strong Teeth
3. Healthy Bones
4. Muscle Growth
5. Weight Loss
6. Reduce Stress
7. Alleviate PMS Symptoms
8. Energy Booster
9. Heartburn Eliminator
10. Disease Fighter

Bash Corner

35 Calories Per Slice

Healthy Life

White High Fiber

Reduced Sodium
No High Fructose Corn Syrup

NET WT. 16 OZ. (1LB) 454G

35 Calories

White High Fiber

Benefits of Fruits

Pineapples help digest food and build strong bones

Watermelons help the body get rid of excess ammonia and helps you heal wounds

Natural oil in oranges keeps your skin young and fresh

Cherries contain antioxidants that protect the body from cancer cells

Drinking lemon water can help cure bad breath

HEALTH TOTAL
ANJALI MUKERJEE

6 REASONS TO EAT MEAT FOR OPTIMAL HEALTH
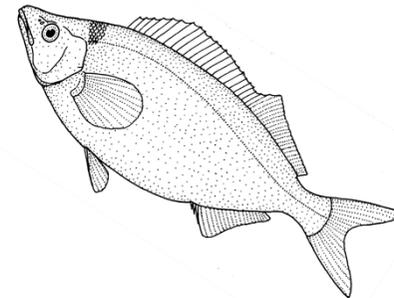
healthylivinghowto.com

Risk-Benefit Assessment

- Usually our research focus is on only risks or benefits
  - one hazard or benefit
  - one food
  - one health effect

- Food is associated with benefits and risks
  - This requires an integrated approach

DTU Food, Technical University of Denmark   30 November 2017
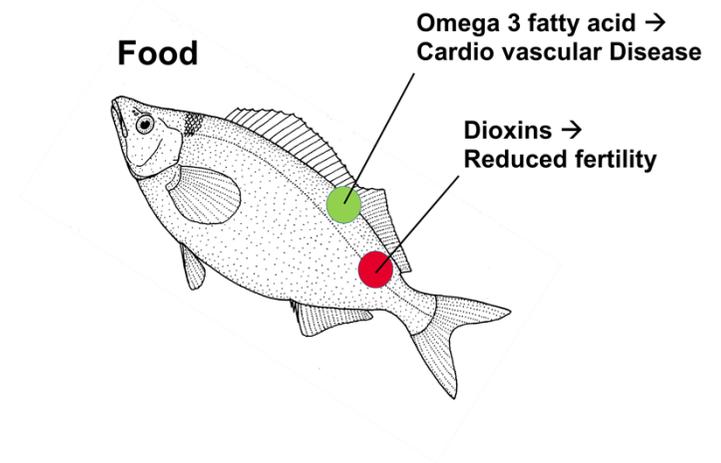
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- Risk-Benefit Assessment at
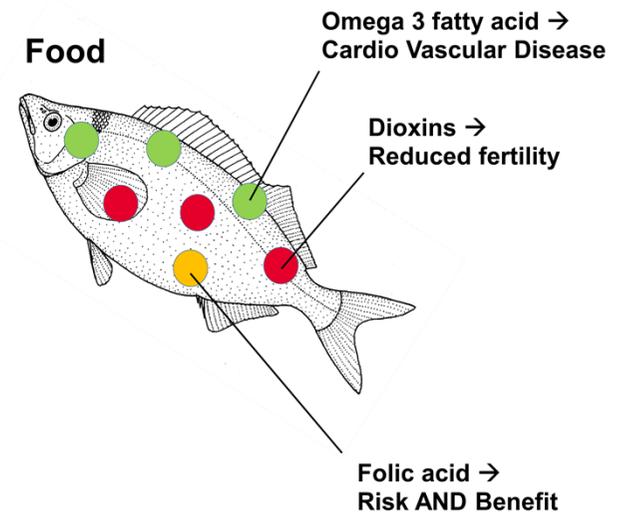different levels:

  - Food product

Food

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- Risk-Benefit Assessment at
different levels:

  - Food product

Food

Omega 3 fatty acid →
Cardio vascular Disease
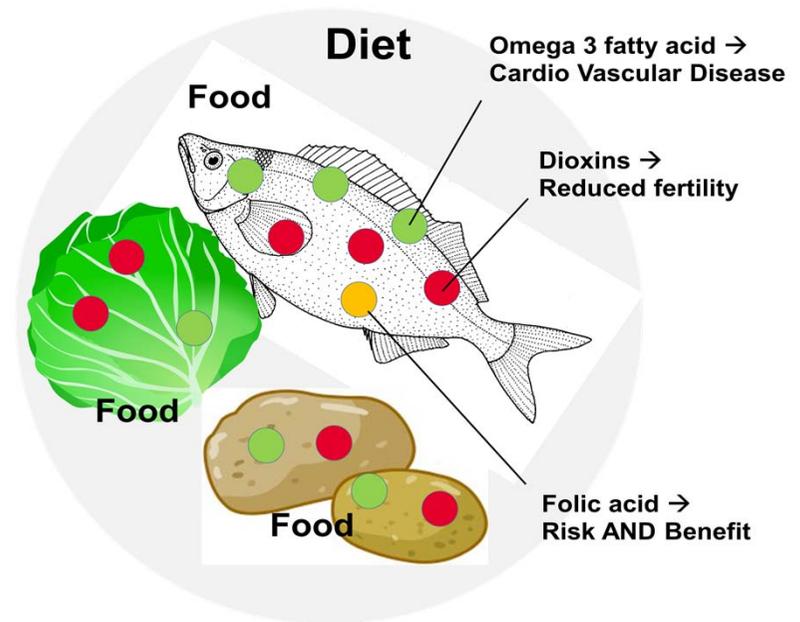
Dioxins →
Reduced fertility

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- Risk-Benefit Assessment at
different levels:
  - Food compound
  - Food product

Food

Omega 3 fatty acid →
Cardio Vascular Disease

Dioxins →
Reduced fertility

Folic acid →
Risk AND Benefit

Risk-Benefit Assessment

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• Risk-Benefit Assessment at
different levels:
  - Food compound
  - Food product
  - Diet

Risk-Benefit Assessment

- Assessing food risks and benefits requires a multidisciplinary approach
  - Toxicological risks
  - Microbiological risks
  - Nutrition
    - risks
    - benefits

- Important differences in terms, concepts and approaches
  - Definitions
  - Nature of health effects and dose-response models
  - Available data
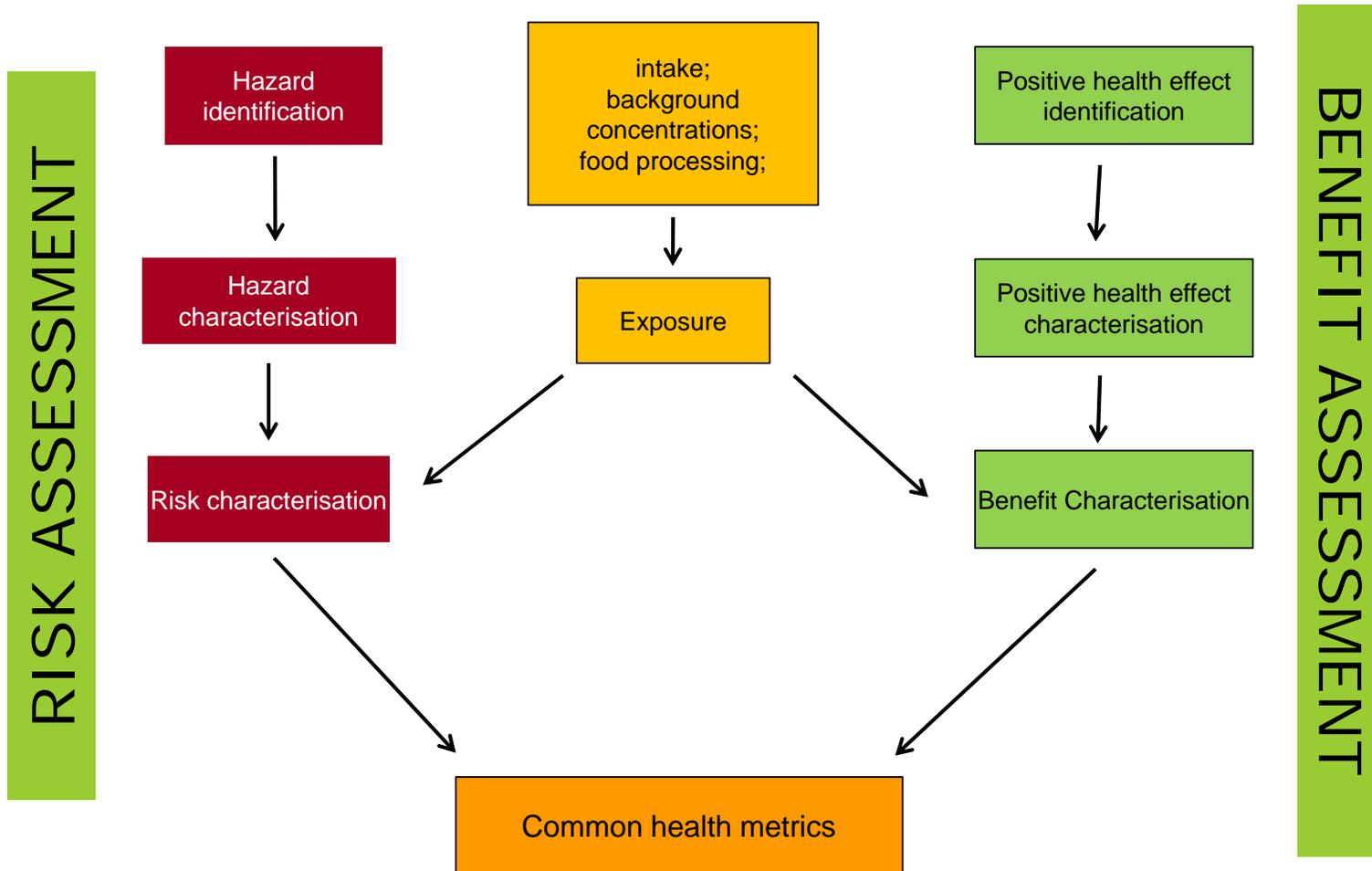 - Common questions and approaches

Food safety risk assessment vs. Nutritional risk and benefit assessment
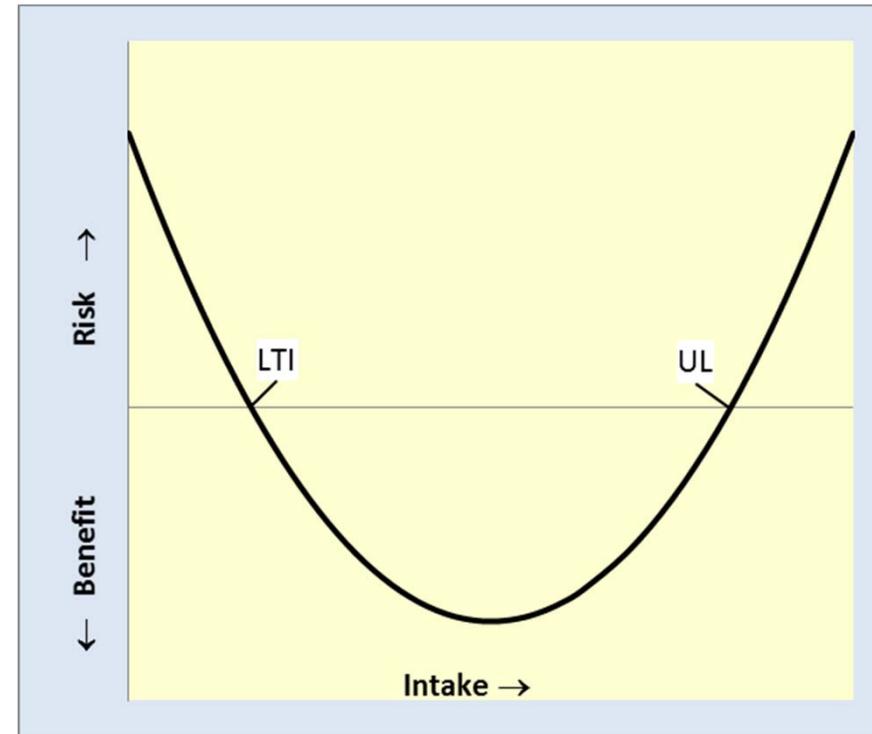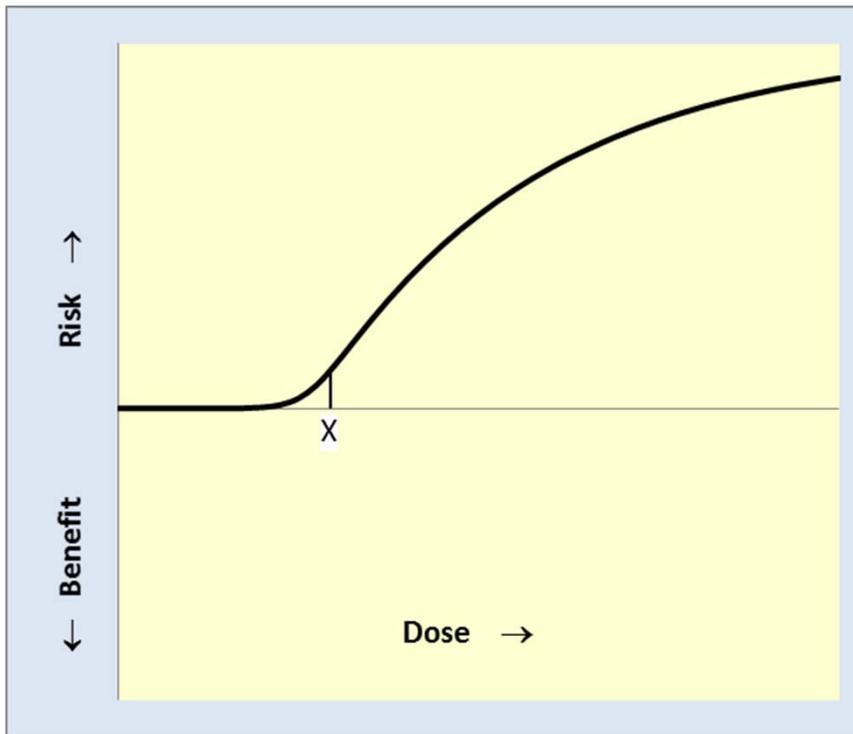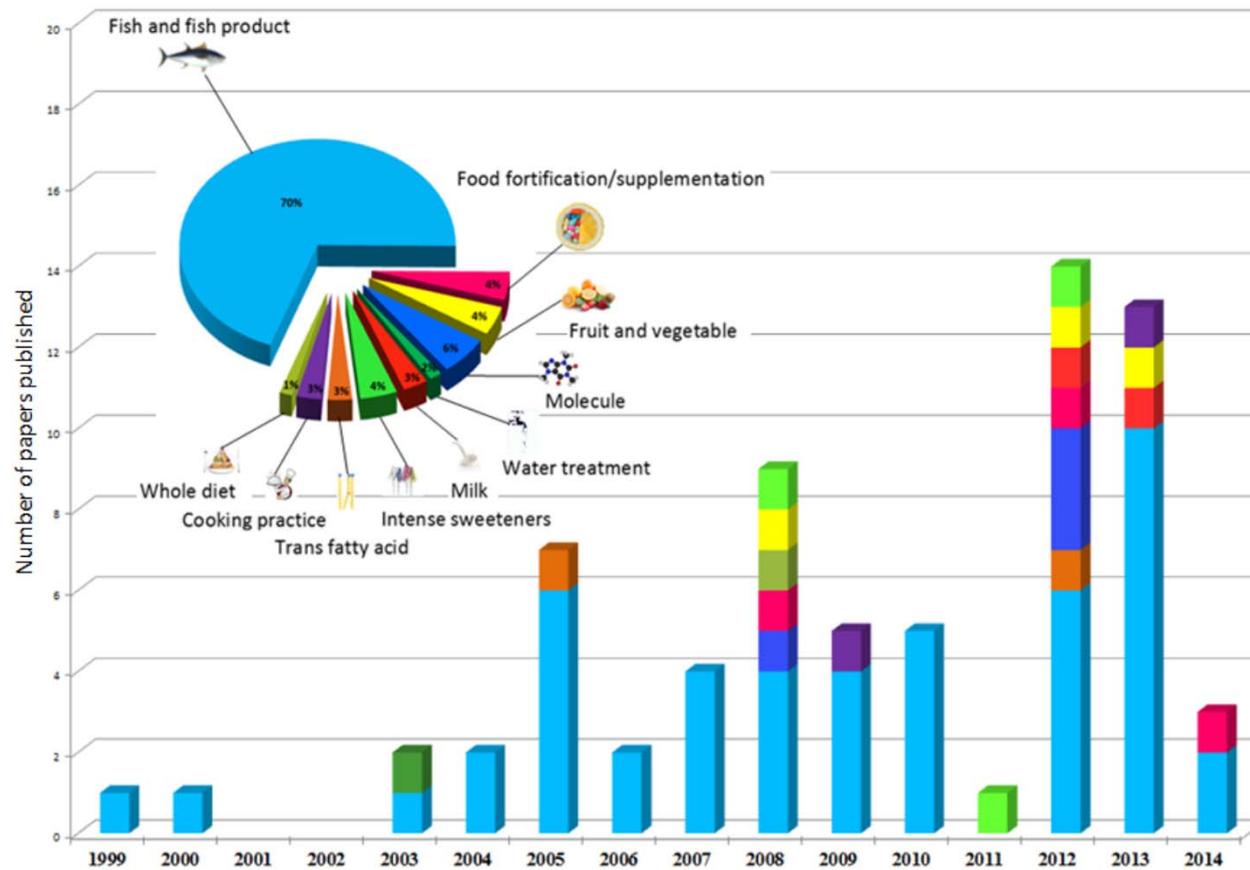
Risk-Benefit Assessment so far

- First studies 10-20 years ago
  - Qualitative comparisons
  - Nutrition and chemicals

- Some EU projects
  - BRAFO
  - BENERIS
  - BEPRARIBEAN

- EFSA opinion 2010

General framework

Risk-Benefit studies performed

Géraldine BOUÉ et al., 2015, European Journal of Nutrition & Food Safety, 5(1), 32.

Risk-Benefit Assessment in Denmark

- Risk-Benefit research group established 2015

- Expertises available at the National Food Institute
  - Toxicology
  - Nutrition
  - Microbiology
  - Risk assessment
  - Epidemiology (*Burden of foodborne diseases*)

MetriX project

- Develop and apply models for quantitative health assessment in
  - Risk-benefit assessment
  - Risk and benefit ranking
  - Burden of disease studies

Current International Activities

- Projects in different countries

- Workshop Nordic countries 2016

- Special sessions and symposia in international conferences

- EFSA sponsored workshop in Copenhagen 2017
  – Informal network established
  – Challenges identified and way forward discussed

Selected challenges

- Metrics and quantification

- Comparing risks and benefits

- The scope of Risk-Benefit Assessment

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How to compare the health impacts of foods?

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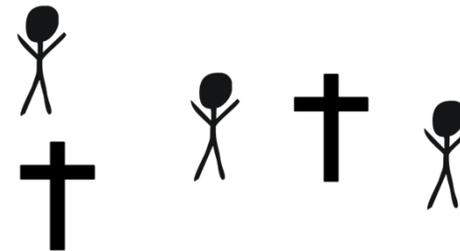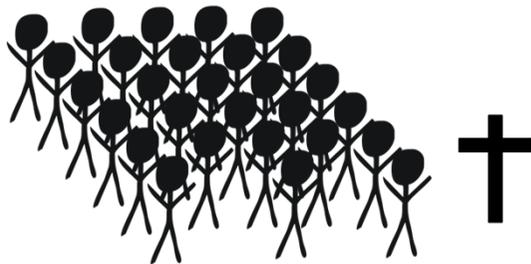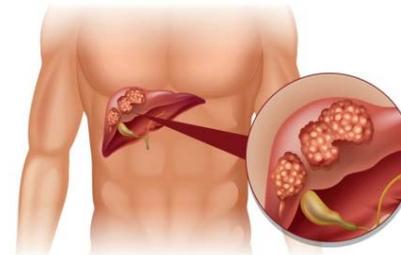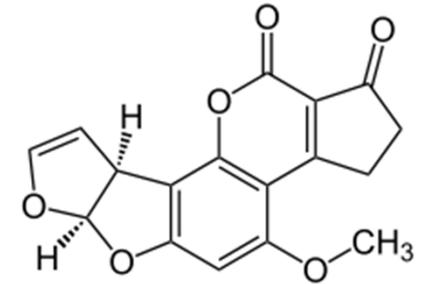
Disability Adjusted Life Years - DALY

Conceptually simple:

- Translate the number of years of life lost due to the diseases, in terms of **loss of quality of life** and by **premature death**

$$DALY = \underline{YLD} + \underline{YLL}$$

Disability Weight — 0 ... 1

| 0 | Age | LE | Population

| | Healthy life years | | Health loss due to morbidity: YLD | | Health loss due to mortality: YLL |
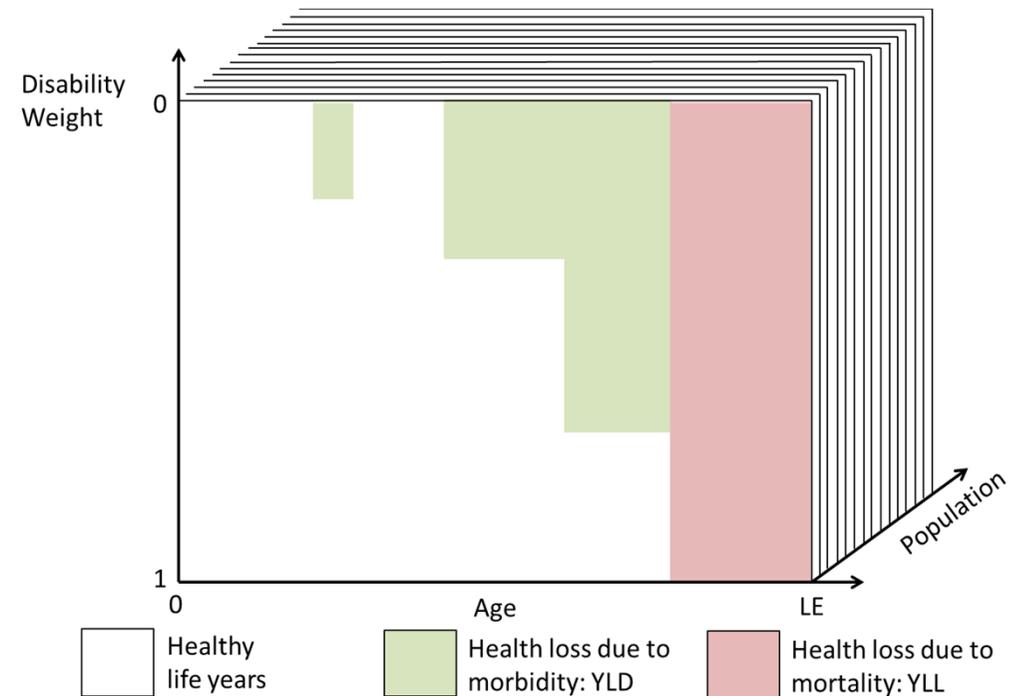
How good are DALYs?

☺ Widely used
 • WHO Global burden of foodborne disease studies

☺ Well developed

☺ One metric
 • combines incidence, severity, mortality
 • quite easily interpreted (average healthy life years lost)

☹ Contains "hidden" and/or subjective values
 • severity weight of disease
 • impact of age at death / onset of disease
  • discount rate over time?
 • no "adaptation" to chronic state of disease
 • choice for life expectancy
 • no impact on family included

☹ One metric
 • different dimensions of health burden are hidden

The case of processed meat: how bad is it?

TIME NOVEMBER 9, 2015

theguardian

Processed meats rank alongside smoking as cancer causes – WHO

UN health body says bacon, sausages and ham among most carcinogenic substances along with cigarettes, alcohol, asbestos and arsenic

Sarah Boseley Health editor

Monday 26 October 2015 12.30 GMT

Bacon, ham and sausages rank alongside cigarettes as a major cause of cancer, the World Health Organisation has said, placing cured and processed meats in the same category as asbestos, alcohol, arsenic and tobacco.

...gency for Research on Cancer said there was ...s group 1 carcinogens because of a causal link

...y carcinogenic to humans". Eating red meat is ...er, the IARC says.

...gram (1.8-ounce) portion of processed meat ...cancer by 18%.

The New York Times

SundayReview | NEWS ANALYSIS

So Will Processed Meat Give You Cancer?

By ANAHAD O'CONNOR   OCT. 31, 2015

How bad is processed meat?

- IARC experts say the evidence is convincing:

the risk of colorectal cancer when eating processed meat is significantly larger than when you do not eat it.

- But **how** bad is it?
  - Relative risk 1.18
  - A 18% increase in risk of colorectal cancer per 50 g per day

  - What does this mean?
    - Incidence increase?
    - Death?
    - DALY?
    - Lifetime risk?

Incidence colorectal cancer in Denmark
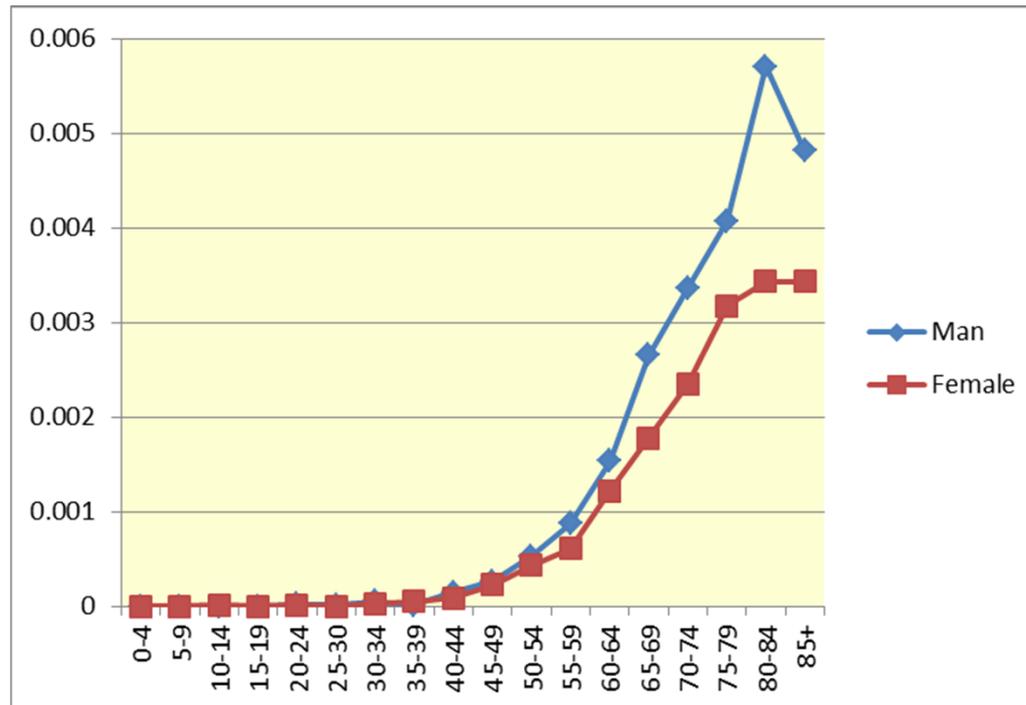
Incidence is not very high and increases with age

Simplified model for Denmark

- Two consumer group:
  - low and high consumers,
  - high consumers eat 50 g processed meat per day more

For one year, 18% increase in risk means:

- Increased probability of acquiring colorectal cancer up to 0.1% at high age
- Increased probability of *fatal* colorectal cancer up to 0.001% at high age

- DALY approach:
  - Expected loss in healthy life days up to half a day

- Increased probability of ever getting colorectal cancer during your life increases to up to 2% around age 85

The same risk but the risk perception of different metrics may be different!

Selected challenges

- Metrics and quantification

- Comparing risks and benefits

- The scope of Risk-Benefit Assessment

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Comparing Risks and Benefits

- Risk assessment and benefit assessment are different by nature

- Risk should be prevented
  - Conservative estimates
  - Worst case scenarios
  - Precautionary principle

- Benefits should be proven
  - Health claims

- Using statistical evidence
we need to be 95% sure there is NO risk to exclude it
we need to be 95% sure there is a benefit to include it

- For fair Risk-Benefit Assessment, risks and benefits should get the same treatment

The risk of Risk-Benefit Assessment

- Benefits should not be an excuse to introduce risks

- Risk-Benefit Assessment should be used to inform on overall health effects
  - One metric may not be enough

- Quantitative approach is ESSENTIAL

Selected challenges

- Metrics and quantification

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Broaden the scope outside the health arena

There is more in food than health

- Economy
- Sustainability
- Consumer risk perception and acceptance
- Social sensitivity

Potential tool:

MCDA (Multi Criteria Decision Analysis)

e.g. Ruzante et al. 2010

Source: IOM, 2015

Example: RIVM study

National Institute for Public Health
and the Environment
Ministry of Health, Welfare and Sport

What *is* on our *plate*?

Safe, healthy and sustainable
diets in the Netherlands

	Scenarios for 2040		
	Safe foods	Healthy diets	Sustainable diets
Safety indicators			
Number of foodborn infections	🟩		1
Percentage of health standard violations	🟩		
Percentage of NVWA fines	🟩		
Confidence in food			
Health indicators			
DALYs due to unhealthy diet		🟩	
Prevalence of overweight		🟩	🟩
SES (social and economic status) differences		🟩	🟩
Ecological indicators	2		
Greenhouse gas emissions	🟥	🟩	🟩
Water use	🟥	🟩	🟩
Biodiversity		🟩	🟩
Consumener indicators			
Price of shopping cart	🟥		🟥
Freedom of choice for consumers	🟥		🟥
Speed/convenience	🟩		
Sociocultural function of food	🟥		
Appreciation of taste of food	🟥		3
Loss of utility	🟥	🟩	
Animal welfare	🟥		
Fair trade	🟥		
Economic indicators			
Added value of agricultural complex	🟩	🟥	4
Export-Import balance of payments	🟩	🟥	

Conclusions

- Risk-Benefit Assessment is a necessary and relevant method to integrate different risk assessment methods with benefit assessment

- Useful methods and frameworks have been developed but
  - More case studies need to be done
  - (Quantitative) method development should continue
  - Think "out of the box"

- New initiatives are taken
  - Take up challenges
  - Collaborative action needed

Thanks!

- My DTU collegues from the Risk-Benefit Research group

- Participants workshop Copenhagen May 2017

- You